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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/316.580 05/21/99 LINN

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THOMAS R FITZGERALD ESQ
JAECKLE FLEISCHMANN & MUGEL LLP
39 STATE STREET
ROCHESTER NY 14614

MM12/0106

EXAMINER

LOKE, S

ART UNIT

PAPER NUMBER

2811

DATE MAILED:
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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/316,580

Applicant(s)
Linn et al.

Examiner
Loke

Group Art Unit
2811



☒ Responsive to communication(s) filed on Nov 8, 1999

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-5, 7-11, and 13-22 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-5, 7-11, and 13-22 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s): _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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1. The amendment filed 5/21/99 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

In the specification,

Page 3, line 28 (^{OK}Interconnected.....layer.), page 4, lines 4-5 (^{OK}Interconnected.....layer.), 7-11
(^{not OK}a homogeneous.....silicide layer), page 8, line 32 (^{OK}but.....that), page 9, lines 1- 2
(^{OK}further.....together).

In the abstract,

Lines 7-8, 15-16 (^{OK}Interconnected.....layer.), lines 10 and 12 (^{OK}unbroken.....layer), lines 16-21
(^{not OK}a.....layer).

Applicant is required to cancel the new matter in the reply to this Office action.

2. Claims 1-5, 7-11 and 13-22 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

^{OK} The original specification in the parent application never discloses the interconnected transistors are disposed in and at the upper surface of the device silicon layer as claimed in claims 1 and 7.

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not OK 1 The specification never discloses the device silicon layer includes doped buried layers abutting the dielectric layer as claimed in claim 4.

not OK 2 The specification never discloses the second dielectric layer comprises diamond as claimed in claim 5.

not OK 3 The original specification in the parent application never discloses the second dielectric layer being bonded to the device layer by the second bonding material as claimed in claim 10.

OK 4 The specification never discloses the interconnected transistors in and at a surface of the device layer as claimed in claim 10.

not OK 5 The specification never discloses the silicide layer comprises a third bonding material that bonds the silicide layer to the handle die and the device wafer as claimed in claim 10.

not OK 6 The specification never discloses doped buried layers abutting the silicide layer and forming components of the transistors as claimed in claim 11.

not OK 7 The original specification in the parent application never discloses the claimed subject matters as claimed in claims 13, 15, 17, 19 and 22.

3. Claims 10, 11 and 13-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

not OK In claim 10, lines 2-3, it is unclear how the first dielectric layer comprising a first bonding material; lines 6-7, it is unclear how the second dielectric layer comprising a second bonding material; line 7, ".....a a....." is not understood.

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not OK

In claim 13, lines 2-3, “.....said first dielectric layer is silicon dioxide portion adjacent said homogeneous silicide layer]” is not understood.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moslehi in view of See et al.

not OK

Moslehi shows a SOI structure in figs. 2a-2e. It comprises: an oxide layer [22] formed on a Si substrate [20]; a silicide layer [40] formed on the layer [22]; insulating layers [32, 34, 36] formed on layer [40]; a Si substrate [26] formed on layer [32].

Moslehi differs from the claimed invention by not showing transistors formed on the Si substrate.

See et al. shows bipolar and MOS transistors [28, 30] formed on a Si substrate in fig. 1.

Since both Moslehi and See et al. teach a SOI structure, it would have been obvious to have the transistors of See et al. in Moslehi because they are widely used transistor devices.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moslehi in view of See et al., further in view of Sugimoto et al.

not OK

Moslehi differs from the claimed invention by not showing the dielectric layer is made of diamond.

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Sugimoto et al. shows the dielectric layer [2] is made of diamond in fig. 1.

Since both Moslehi and Sugimoto et al. teach a SOI substrate, it would have been obvious to have the diamond insulating layer of Sugimoto et al. in Moslehi because it prevents a heat-dissipating property from being lowered.

7. Claims 10, 11, 13, 14, 16 and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moslehi in view of See et al., further in view of Iwamatsu.

OK Moslehi differs from the claimed invention by not showing a bonding material includes nitrogen material.

Iwamatsu shows nitrogen can be implanted into a silicon dioxide layer [2, 3] in fig. 1.

Since both Moslehi and Iwamatsu teach a SOI substrate contain silicon oxide, it would have been obvious to have the nitrogen implant of Iwamatsu in Moslehi because it prevents separation of a silicon film from the bonding face of an SOI substrate.

8. Claims 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moslehi in view of See et al., further in view of Iwamatsu and Sugimoto et al.

Moslehi differs from the claimed invention by not showing the dielectric layer is made of diamond.

OK Sugimoto et al. shows the dielectric layer [2] is made of diamond in fig. 1.

Since both Moslehi and Sugimoto et al. teach a SOI substrate, it would have been obvious to have the diamond insulating layer of Sugimoto et al. in Moslehi because it prevents a heat-dissipating property from being lowered.

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9. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ochiai in view of Kameyama et al.

Ochiai discloses a semiconductor device in figs. 7-8. It comprises: a plurality of thin film transistors formed on an insulating layer [51, 55] formed on a Si substrate [50]; a resistance layer [52] formed under each of the transistors.

not OK

Ochiai differs from the claimed invention by not showing the resistance layer is made of silicide.

Kameyama et al. shows a tungsten silicide resistor [120a] in figs. 3 and 4.

Since both Ochiai and Kameyama et al. teach a resistor, it would have been obvious to have the resistor of Kameyama et al. in Ochiai because it is a widely used resistance material.

10. Claims 10, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ochiai in view of Kameyama, further in view of Iwamatsu.

Ochiai differs from the claimed invention by not showing a bonding material includes nitrogen material.

OK

Iwamatsu shows nitrogen can be implanted into a silicon dioxide layer [2, 3] in fig. 1.

Since both Ochiai and Iwamatsu teach a SOI substrate contain silicon oxide, it would have been obvious to have the nitrogen implant of Iwamatsu in Ochiai because it prevents separation of a silicon film from the bonding face of an SOI substrate.

11. Applicant's arguments filed 11/8/99 have been fully considered but they are not persuasive.

It is urged, in page 4 of the remarks, that fig. 3 shows a partially completed MOSFET in

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island 322 and the MOSFET is just one of thousands of such devices in an integrated circuit fabricated on the bonded wafer. In addition, the above MOSFET would be connected with other transistors in the circuit. It is true that there are thousands of such MOSFET in an integrated circuit. However, the original specification never discloses these MOSFETs are connected with other transistors in the circuit.

It is urged, in page 4 of the remarks, that fig. 6 shows the buried layer of claim 4 and the diamond layer of claim 5. However, claims 4 and 5 are depending to claim 1 which discloses the device of figs. 3f and 3g. Neither fig. 3f nor fig. 3g discloses the buried layer and the diamond layer.

It is urged, in page 5 of the remarks, that Moslehi never discloses the claimed structure of the claims. However, the combination of Moslehi and See et al. shows all the required elements of the claimed invention. In addition, the combination of Moslehi, See et al. and Sugimoto et al. shows the required element of the dependent claim. It is also urged that the metal-silicide grid structure of Moslehi does not function as a diffusion barrier. However, it is well known in the art that metal silicide layer can prevent diffusion of harmful ions into the device layer.

It is urged, in page 6 of the remarks, that Ochiai never discloses trenches to define device islands and the resistance layer comprises a silicide. However, the insulating layers [51, 55] of Ochiai isolate the transistors in the gate array. The insulating region between the transistors can be considered as the trench. The combination of Ochiai and Kameyama et al. shows the

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resistance layer comprises a silicide. Ochiai also shows conductive material [60] connected to the resistance layer [52].

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (703) 308-4920.

sl

January 5, 2000

STEVEN H. LOKE
PRIMARY EXAMINER
GROUP 2500

